

Boardman (W. S.)

THE

SUBCUTANEOUS USE OF CHLORIDE OF GOLD AND SODIUM WITH
IODIDE OF MANGANESE IN PULMONARY TUBERCULOSIS.

By WILLIAM S. BOARDMAN, M.D.



[Reprinted from the Boston Medical and Surgical Journal
of May 17, 1894.

THE TREATMENT OF PULMONARY TUBERCULOSIS BY THE SUBCUTANEOUS USE OF THE CHLORIDE OF GOLD AND SODIUM WITH THE IODIDE OF MANGANESE.

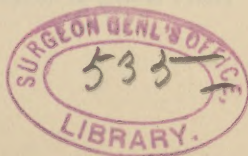
BY WM. S. BOARDMAN, M.D., BOSTON.

WE have read and heard so much about new remedies and modifications of new remedies for the treatment of phthisis, that now to many the subject fails to excite an interest.

The methods of treatment are too numerous to mention. One is almost startled by the list of drugs and methods proposed, in reading Solis-Cohen's article on "Tuberculosis," in "Hare's System of Practical Therapeutics." Yet there must be something beneficial in these remedies, even if there is nothing specific.

The brilliant methods of Koch, dimmed by the noxious elements in his tuberculin and brought to a glow again by the researches of Klebs and Hunter, are undoubtedly more for good than anything hitherto proposed. Although we seem so near the desired result, it has not yet been obtained in the ideal that was first conceived; nevertheless, it behooves us to make the most of what we have, while striving for something better.

From the earliest time, the attempt has always been made to combat the marasmus of phthisis by dietetic and hygienic measures. How slow and uncertain a procedure it has been is only too well known to us all. If in any way we can aid the process of nutrition and maintain or increase the strength of the patient, a great deal will be done towards staying the disease, if not directly tending to a cure.



One mode of treatment that has been tried considerably yet spoken of by comparatively few writers, is the subcutaneous use of a solution in glycerine, of the chloride of gold and sodium with the iodide of manganese. In March, 1891, an article in the *Medical Record*, by Dr. J. B. White, extolled this combination as a treatment for phthisis, and cited a number of cases to show the beneficial results obtained. Another article in September, 1892, by the same author, appeared to supplement and confirm the results of the first paper, being written in a very earnest and pleasing manner. As the combination of the chloride of gold and sodium with the iodide of manganese, is, under ordinary circumstances, likely to result in the formation of a precipitate, the author of the above-mentioned articles was asked to state the method of preparing the solution. Since the process was not given and the injection fluid could only be obtained in New York, it was thought to be of sufficiently scientific interest to the profession to have an analysis of Dr. White's preparation; and Mr. Wm. C. Durkee, Ph.G., kindly consented to undertake the chemical work with this result.

"The proximate chemical examination of the injection fluid is as follows. It has a dark-amber color, with a specific gravity of 1,260, a styptic taste and a syrupy consistency.

"According to Dr. J. Blake White's statement, each drop should contain the equivalent of one-fiftieth of a grain of the chloride of gold and sodium, and one-fiftieth of a grain of the iodide of manganese, that is, each drop should represent one-twenty-fifth of a grain of the combined salts.

"He does not mention the method of obtaining the drop, whether from the bottle or a medicine-dropper; and although changes in the viscosity of the liquid owing to the temperature, the rapidity with which the drops are formed, and the shape of the material from which the drop falls largely govern the size, it was assumed that a drop from the original five-cubic-centimetre bottle, at about 70° F., and forming at a speed

of one in two and a half seconds, would be about the size usually obtained and probably intended by the quoted statement.

"Several careful weighings of ten-drop quantities of the liquid were made and the drops found to average 77 milligrammes each, and supposably contained one-fiftieth of a grain (.0013) of U. S. P. strength of chloride of gold and sodium, and the same quantity of iodide of manganese, or 169 mg. of each in 10 gm. of injection.

"Ten grammes of the fluid were found to contain .01737 gm. of metallic gold, equal to .05352 gm. chloride of gold and sodium U. S. P., or about one-third the amount claimed. The liquid is composed mainly of glycerine, and contains free iodide, iodine in the form of iodate (also as iodide), chlorine, sodium, potassium and manganese.

"As the method of preparing the injection fluid recommended by Dr. White was not made public, the following process has been devised, which yields a solution containing the ingredients he has reported as useful and of the strength he recommends. Take of

¹ Gold and sodium chloride, U. S. P.	. . . . .	1.69 gm.
Manganese sulphate . . . . .	. . . . .	2.44 gm.
Potassium iodide . . . . .	. . . . .	4.62 gm.
Diluted alcohol . . . . .	. . . . .	10.0 c. c.
Glycerine	} of each a sufficient quantity.	
Distilled water		

"Dissolve the gold and sodium chloride and one gramme of potassium iodide separately, in sufficient glycerine to make each solution weigh 25 gm. using only a very gentle heat, if any; when cold mix the two solutions. Dissolve the manganese sulphate in sufficient distilled water to make 10 c. c., and 3.62 gm. of potassium iodide in sufficient diluted alcohol to make 10 c. c.; mix the two solutions, and allow the containing vessel to stand in powdered ice for several hours, to thoroughly precipitate the potassium sulphate. Then decant 10 c. c. of the clear liquid into 40 gm. of glycerine; evaporate on a water bath until the total

¹ It is best to prepare this chemical or to use an article which is known to be of full strength, as market samples were found to contain less gold than the labels indicated.

weight is reduced to 40 gm., and add glycerine to make 50 gm. Mix this solution with the solution of gold and sodium chloride, and keep in amber glass-stoppered bottles. Each 77 mg. (about one drop) contains the equivalent of $1\frac{3}{10}$ mg. (one-fiftieth of a grain), of gold and sodium chloride and the same quantity of manganese iodide."

The injections were given in the forearm, upper arm and subclavicular region by an ordinary hypodermic syringe.

The solution prepared has been used in the manner advised by Dr. White, the initial dose usually being one drop (equal to one-twenty-fifth of a grain of the combined salts of gold and manganese) diluted with a few drops of a one-per-cent. solution of carbolic acid, and increased only as the constitutional disturbance remained at a minimum or ceased to appear after several doses.

In some patients the reaction appeared within two hours — as headache, backache and general malaise — lasting twenty-four to forty-eight hours; in others it was but little marked and disappeared within one or two hours after an injection.

The pulse has been found to be full and slow with subnormal temperature in some, while in others the pulse was increased in rate with a slight rise in temperature.

The local effect varied, in some the solution caused considerable inflammation, in others the injection was only marked by an induration and slight tenderness about the puncture. It seemed to depend upon the amount of loose connective-tissue present and the individual susceptibility to irritation.

Cough-mixtures, tonics and hygienic measures have also been made use of as opportunity permitted.

One thing was observed quite generally, as noticed by another writer — within two weeks or thereabouts after beginning the injections, the appetite was increased, so much as to cause the remark of the patient to the effect.

The cough and expectoration in some were lessened,

TREATMENT WITH SUBCUTANEOUS INJECTIONS OF GOLD AND MANGANESE (DR. BOARDMAN).

No. Sex. Age. Social Condition. Occupation. Family History.	Patient's History. Physical Examination at Beginning of Treatment.	First Treatment. Weight. Sputum.	Last Treatment. Weight. Sputum.	Subcus. Total Amount. Largest Dose.	Physical Examination at the End of Treatment.
I. Female. 20 years. Single. Home-work. Mother phthisical, one brother died of phthisis.	Has not felt well for 6 months. Cough for 3 months. Loss of flesh and strength. Sweats considerably by day. No night sweats. Menses regular. Considerable emaciation. Hectic flush. Right clavicle more prominent than the left. No dulness. Respiration roughened nearly everywhere. A few fine moist râles at the left apex. Medium moist râles at the right apex anterior.	Feb. 6, 1893. 111 pounds. 3 fiss-iii. No tubercle bacilli found. 11 A. M. Pulse 76. Temp. 99°. Resp. 31.	June 13, 1893. 108½ pounds. (Did weigh 117 lbs. after 34 subcus., May 6th.) 3 i-iss. Tubercle bacilli fairly numerous. 12.30 P. M. Pulse 68. Temp. 99.3°. Resp. 35.	50 112 drops. 6 drops.	<i>After 30 Subcus.</i> Dulness not marked. Roughened respiration at left apex anterior and over left front. Suspicion of a few occasional fine râles at left apex anterior. Harsh bronchial respiration over 2d left interspace. (This was the seat of pain 4 weeks ago.) Slightly roughened respiration at right apex anterior and over upper half of right front. Roughened respiration in each axilla. Slightly roughened respiration at right apex posterior and over upper half of right back. Roughened respiration at left apex posterior and over left back. <i>After 50 Subcus.</i> No dulness. Respiration roughened everywhere. A suspicion of fine râles at left apex anterior and over upper left back. (Patient feels better.)
II. Female. 27 years. Single. Parlor-girl. One sister died of phthisis.	Pneumonia 2 years ago; never fully regained her health. Hoarse since last fall. No cough. No expectoration. No hæmoptysis. No sweats. Loss of flesh and strength. Menses regular (1 day, scanty). Variable appetite. Respiration roughened everywhere. Fine moist râles over right and left upper backs. Ulceration at middle of left vocal cord.	Feb. 17. 115 pounds. No sputum. (Former weight 130 pounds.) 11 A. M. Pulse 96. Temp. 98.8°. Resp. 21.	April 26. 111½ pounds. No sputum. 12 M. Pulse 84. Temp. 99°. Resp. 21.	21 29 drops. 5 drops.	No dulness. Fine moist râles at right apex anterior, under right clavicle and over upper half of right chest anterior. Respiration slightly roughened over lower half of right chest, in right axilla, over left chest and in left axilla. Fine moist râles at left apex posterior, between left scapula and spine, at right apex posterior and between right scapula and spine. Left vocal cord ulcerated nearly its entire length and considerably thickened. (Patient feels better.)
III. Female. 19 years. Single. Paper-box maker. Parents died of phthisis.	Cough for 6 months. Occasional night sweats. Fairly strong. Menses every 3-4 weeks, and scanty. Appetite poor. Relative dulness at left apex anterior and below left clavicle. Bronchial respiration at left apex anterior and over upper half of left front. Few moist râles over upper half left front. Roughened respiration at right apex and over right front. A click heard at right apex anterior. Harsh respiration and medium moist râles in left axilla. Roughened respiration in right axilla. Bronchial respiration at right apex posterior and over upper right back. Roughened respiration over lower right back. Few clicks heard over upper right back. Roughened respiration over left back. Voice sounds near below left clavicle. Vocal fremitus increased at left front.	March 6. 109 pounds. (Has weighed 112½ pounds.) 3 vi-viii. Tubercle bacilli present. 11.45 A. M. Pulse 84. Temp. 100°. Resp. 22.	May 29. 98 pounds. 3 iii-iv. Tubercle bacilli present. 12.30 P. M. Pulse 88. Temp. 100°. Resp. 26.	22 48 drops. 6 drops.	Relative dulness at left apex anterior and below left clavicle. Cracked-pot sound under left clavicle. Bronchial respiration at left apex anterior and all over left front. Medium and coarse râles at left apex anterior and all over left front. Clicks heard at right apex anterior and under right clavicle. Roughened respiration over upper half of right front. Medium and fine râles in left axilla. Sibillant râles in right axilla. Respiration rough and harsh at right apex posterior and above right scapula. Clicks heard at right apex posterior and between right scapula and spine. Fine râles at left apex posterior. Fine and medium râles over left back. Voice very near under left clavicle and between right scapula and spine. Vocal fremitus increased at left front. (Patient feels about the same as before treatment.)
IV. Female. 23 years. Single. Seamstress. Family history not obtained.	No cough. No expectoration. No loss of weight. Menses regular. Appetite fair. Loss of strength. No dulness. Sibillant râles over left front. Roughened respiration all over right back. Few fine râles at right apex posterior.	March 6. 100 pounds. No sputum. 12 M. Pulse 80. Temp. 92.2°. Resp. 24.	April 12. 99½ pounds. No sputum. 12.40 P. M. Pulse 92. Temp. 98.6°. Resp. 23.	11 11½ drops. 2 drops.	No relative dulness. Respiration roughened everywhere. Sibillant râles at upper left front. Voice near between right scapula and spine. (Patient feels about the same as before treatment.)
V. Female. 20 years. Single. Tobacco stripper. Father and one brother died of phthisis.	Cough seven months. No night sweats. No hæmoptysis. No loss of weight. Menses regular. Feels fairly strong. No dyspnœa. Appetite fair. Dulness at right apex, anterior and posterior, and below right clavicle. Cracked hot sound over 2d right interspace (near sternum). Bronchial respiration over right front and back, and left back. Roughened respiration over left front. Few medium râles at right apex anterior, over upper right front, in right axilla, and between right scapula and spine. Suspicion of râles between left scapula and spine. Voice very near below right clavicle.	March 11. 119½ pounds. 3 i. Tubercle bacilli present. 12.45 P. M. Pulse 108. Temp. 100°. Resp. 24.	April 22. 113 pounds. 3 i. Tubercle bacilli present. 12 M. Pulse 96. Temp. 99°. Resp. 24.	17 23 drops. 4 drops.	Dulness at right apex anterior below right clavicle, at right apex posterior and over upper half of right back. Cracked-pot sound over 2d right interspace. Bronchial respiration over upper half of right and left chest, anterior and posterior. Broncho-vesicular respiration in right axilla. Roughened respiration in left axilla and over lower right and left back. Respiration rather amphoric over 2d right interspace. Medium râles at right apex anterior, over upper right front and in right axilla. Numerous clicks at right apex posterior and over upper right back. Suspicion of fine râles at left apex posterior. Occasional fine râles at left apex anterior. Medium râles below left clavicle. Voice very near at upper right chest, anterior and posterior. (Patient feels better.)
VI. Female. 29 years. Married. (3 children, youngest 3 months old.) Home-work. Family history negative.	Cough 7 months. No hæmoptysis. Occasional sweats. Has lost flesh. Does not feel weak. Menses regular. No dyspnœa. Appetite poor. Hectic flush. Considerable emaciation. Right clavicle more prominent than left. Relative dulness not marked. Broncho-vesicular respiration at left and right apex anterior. Slightly roughened respiration at left apex posterior. Fine moist râles at each apex anterior. Sibillant râles at left apex anterior, in right axilla and over right back. Moist râles between right scapula and spine. Pleuritic stitch and few pleural râles in right anterior axillary line.	March 14. 92 pounds. 3 iii-iv. Tubercle bacilli present. 1.30 P. M. Pulse 100. Temp. 100°. Resp. 26.	May 25. 88½ pounds. 3 i-ss-ii. Tubercle bacilli present. 12.30 P. M. Pulse 76. Temp. 98.4°. Resp. 25.	17 29 drops. 5 drops.	Relative dulness not marked. Respiration slightly roughened below left clavicle, broncho-vesicular at right apex anterior and over upper right front, bronchial at right apex posterior, roughened above right scapula, slightly roughened at left apex posterior and over upper left back. Clicks heard at left apex. Few fine moist râles at left apex anterior. Numerous fine râles at right apex anterior. Fine râles under right clavicle. Suspicion of fine râles at right apex posterior. Fine râles between right scapula and spine. Voice nearer over right upper front and back. Vocal fremitus increased over right upper front and back. (Patient feels better.)
VII. Male. 43 years. Single. Baker. Family history negative.	Cough 3 months. No expectoration. No hæmoptysis. Night sweats for the last two months. Has lost flesh. Appetite poor. Right clavicle more prominent than left. Relative dulness not marked. Broncho-vesicular respiration at right apex and over right front. Rather harsh respiration over right front near sternum. Broncho-vesicular respiration in left axilla. Increased vesicular respiration in right axilla. Roughened respiration in right anterior axillary line. Broncho-vesicular respiration over upper half left back. Sibillant râles at left apex and over left front. Medium and fine râles at left apex anterior and over left front. Medium râles in left axilla. Sibillant râles over upper half left back. Medium and fine râles over upper half left back.	March 20. 115 pounds. No sputum. 2.30 P. M. Pulse 80. Temp. 97.4°. Resp. 24.	June 8. 115 pounds. No sputum. 12.30 P. M. Pulse 88. Temp. 99.8°. Resp. 22.	25 79 drops. 6 drops.	Coughs less than before. No expectoration. Still sweats a little at night. Appetite poor. No relative dulness. Slightly roughened respiration over middle of left front and at lower part of right axilla. Fine moist râles at left apex anterior and under left clavicle. Sibillant râles over left front. Right apex and front chiefly negative. Fine moist râles in left axilla. Signs chiefly negative in right axilla and over right back. (Very fine crepitation at inferior angle of right scapula.) Fine moist râles at left apex posterior. Occasional sibillant râles over left back. (Patient feels better.)
VIII. Male. 34 years. Single. Laborer. Family history negative.	Cough 2 years. Pneumonia in November, 1892. Cough now moderate. Expectoration mostly mucus. No night sweats (formerly had them). Has lost flesh (gaining now). Appetite fair. Relative dulness not especially marked. Roughened respiration over right front and in each axilla. Harsh respiration at right apex posterior. Roughened respiration over right back and over lower half left back. Fine moist râles at left apex anterior and below left clavicle. Occasional fine râles at right apex anterior. <i>Larynx.</i> Thickening of interarytenoid fold. Enlarged and immovable right arytenoid. No movement of right vocal cord.	April 17. 166 pounds. (Former weight 195 pounds.) 3 v-vi. Tubercle bacilli present. 1 P. M. Pulse 76. Temp. 97°. Resp. 24.	June 23. 169 pounds. 3 ii-iii. Tubercle bacilli present. 11 A. M. Pulse 64. Temp. 96°. Resp. 24.	15 30 drops. 3 drops.	Relative dulness not marked. Broncho-vesicular respiration at left apex anterior. Slightly roughened respiration over left front. Broncho-vesicular respiration at right apex anterior. Roughened respiration over right front and in each axilla. Broncho-vesicular respiration at right apex posterior. Roughened respiration over right back. Slightly roughened respiration at lower left back. Fine moist râles at left apex anterior, under left clavicle and at right apex anterior. Few fine moist râles above left scapula. Larynx about the same as before. (Patient feels better.)
IX. Male. 35 years. Married. Laborer. Family history negative.	Cough 4½ months. Expectoration scanty, muco-purulent. Hæmoptysis 4 years ago. Has lost flesh. Appetite poor. Relative dulness not especially marked. Roughened respiration in right axilla. Broncho-vesicular respiration at left apex posterior, over left back, and at right apex posterior. Roughened respiration over right back. Suspicion of fine râles at left apex anterior. Medium râles at right apex anterior. Suspicion of fine râles at left apex posterior. Sibillant râles over left and right backs. Fine râles at right apex posterior.	April 18. 121½ pounds. (Former weight 146 pounds.) 3 ii. No tubercle bacilli found. 1.30 P. M. Pulse 76. Temp. 98°. Resp. 24.	June 24. 116½ pounds. 3 ii. Small number of tubercle bacilli present. 1 P. M. Pulse 84. Temp. 98.7°. Resp. 30.	21 67 drops. 6 drops.	No relative dulness. Broncho-vesicular respiration at left apex anterior. Slightly roughened respiration over upper half of left front. Broncho-vesicular respiration at right apex anterior. Slightly roughened respiration over right front and in each axilla. Broncho-vesicular respiration at right apex posterior, over upper half of right back, at left apex posterior and above left scapula. Occasional fine râles at right apex anterior. Occasional fine and medium râles at right apex posterior and between right scapula and spine. (Patient feels better.)
X. Male. 46 years. Married. Furniture mover. Family history negative.	Cough one year. Expectoration muco-purulent. No hæmoptysis. Dyspnœa on exertion. Night sweats. Has lost flesh. Appetite good. Relative dulness not marked. Bronchial respiration at left apex and over left front, at right apex posterior and over right and left backs. Broncho-vesicular respiration at right apex anterior and over right front, and in each axilla. Fine, moist râles at left apex anterior. Medium, moist râles over left front. Fine and medium râles at right apex anterior, over right front, at right apex posterior, and over right back. Fine râles in left axilla and over upper half left back. Medium râles in right axilla.	April 19. 117½ pounds. 3 i-ss. Tubercle bacilli present. 1.20 P. M. Pulse 88. Temp. 99°. Resp. 28.	June 16. 117 pounds. 3 v. Tubercle bacilli present. 1.20 P. M. Pulse 88. Temp. 99°. Resp. 28.	15 45 drops. 4 drops.	Relative dulness not marked. Broncho-vesicular respiration at left apex anterior. Bronchial respiration over upper half of left front. Broncho-vesicular respiration at right apex ant. and over right front and in each axilla. Bronchial respiration at right apex posterior, over right back, at left apex posterior and over left back. Fine moist râles at left apex anterior. Very sibillant râles at left apex anterior. Fine moist râles over upper half of left front. Medium moist râles at right apex anterior, over right front and in right axilla. Fine moist râles in left axilla. Medium moist râles at right apex posterior, over right back and over upper half of left back. (Patient feels "slightly better.")

SUMMARY OF ALL CASES TREATED AND RESULTS.

	Sex	How long Sick	Age	Social Condition			Fam. Hist. of Phthisis	Bacilli in Sputum	No Bacilli in Sputum	Examinations of Sputum not made	Duration of Treatment	Number of Injections	*Result on Examination			Subjective Result		
				S.	M.	Wid.							Better	Not Imp.	Worse	Better	Not Imp.	Worse
1st Stage, 41 . .	Females, 16	2 mos. to 2 yrs.	16 to 40 yrs.	9	6	1	9	5	4	7	1 to 128 days	1 to 50	2	0	3	8	8	0
	Males, 28	2 mos. to 2 yrs.	19 to 58 yrs.	19	8	1	9	21	0	7	1 to 72 days	1 to 37	1	9	2	9	18	1
2d Stage, 8 . .	Females, 2	6 to 18 mos.	28 to 35 yrs.	0	2	0	1	2	0	0	10 to 44 days	7 to 5	0	0	0	0	1	1
	Males, 6	6 mos. to 3 yrs.	29 to 54 yrs.	3	2	1	4	4	0	2	1 to 33 days	1 to 15	0	1	0	3	3	0
3d Stage, 2 . .	Females, 2	7 mos. to 3 yrs.	20 to 35 yrs.	1	0	1	2	2	0	0	42 to 52 days	4 to 17	0	0	2	1	0	1
20 females, 34 males; total, 54.		Av. 13 mos.	Av. 31½ yrs.	32	18	4	25	34	4	16	Av. 30 days	Av. 9	3	10	7	21	30	3

GROUP I.—PATIENTS TREATED WITH GOLD AND MANGANESE.

	Sex	Largest Dose.	Total Amount Injected.	*Result on Examination			Subjective Result		
				Better	Not Imp.	Worse	Better	Not Imp.	Worse
1st Stage, 32 . .	Females, 16	.24 gr.	½ to 122 gtt.	2	0	4	8	8	0
	Males, 16	.24	1 to 79	1	3	0	6	10	0
2d Stage, 6 . .	Females, 2	.08	4 to 6	..	..	..	0	1	1
	Males, 4	.16	1 to 52	..	..	..	2	2	0
3d Stage, 2 . .	Females, 2	.16	1 to 23	0	0	2	1	0	1
20 females, 20 males; total, 40.				3	3	6	17	21	2

GROUP II.—PATIENTS TREATED WITH HUNTER'S MOD. B.

1st Stage, 12 . .	Females, 0	..	..	..	..	..	..	..	..
	Males, 12	.125 gm.	.005 to 1.855 gm.	0	6	1	3	8	1
2d Stage, 2 . .	Females, 0	..	..	..	..	..	..	..	..
	Males, 2	.075	.025 to .075	0	1	0	1	1	0
3d Stage, 0 . .	..... 0	..	..	..	..	..	..	..	..
No females, 14 males; total 14.				0	7	1	4	9	1

GROUP III (taken from Group I).—PATIENTS TREATED FIRST WITH GOLD AND MANGANESE, AND LATER WITH HUNTER'S MOD. B.

1st Stage, 9 . .	Females, 4	.100 gm.	.025 to 1.095 gm.	1	1	0	3	1	0
	Males, 5	.020	.005 to .050	0	0	0	0	5	0
2d Stage, 0 . .	Females, 0	..	..	..	..	..	..	..	..
	Males, 0	..	..	..	..	..	..	..	..
3d Stage, . . .	Females, 1	.170	5.430	0	0	1	0	1	0
5 females, 5 males; total, 10.				1	1	1	3	7	0

* The result on physical examination could not be ascertained in every case, since some patients stopped their visits unexpectedly, before a final examination could be made.

in others not appreciably affected. Night-sweats usually ceased. The general appearance and feelings of the patients improved, and they did not hesitate to declare themselves greatly benefited.

On making a physical examination of a patient after a few injections, the former condition of things may be somewhat aggravated. At such a time I have found the signs more marked, especially the auscultatory signs; later the results were variable.

The theory that the preparation of gold is eutrophic, while the manganese is anti-anæmic, seems to be well borne out. That an improvement can be secured in some cases I feel quite confident, but as to complete and permanent recoveries I am not so certain.

The exact way in which these injections affect the pulmonary tissue is more or less a matter of conjecture; nevertheless, the remedy appears to act as a tonic to the waning strength of the patient, also to cause a certain amount of irritation and inflammation around the foci of infection (as sometimes shown by bloody sputum after a large dose), which may eventually result in an encapsuling of the pathological portions, or their replacement by dense fibrous tissue.

However, be it as it may, the subcutaneous use of the chloride of gold and sodium with the iodide of manganese certainly improves the majority of patients subjectively; and if a cure does not result, they are at least in a most promising condition for treatment by modified tuberculin or its allied products. The strongest argument in favor of this treatment is the fact that when properly given no injury can be done, while there is great probability of an improvement if not a cure.

Appended is the full report of ten cases treated by gold and manganese, also the tabulated report of fifty-four cases, — some having been treated with gold and manganese, and some with Hunter's modification B. (kindly furnished by Dr. Trudeau of Saranac Lake, N. Y.).

In regard to the latter method of treatment, I will briefly state, that while not obtaining the results of

Dr. Trudeau, I found much in its favor to warrant a further trial.

I have also been using for several months Klebs' Tuberculocidin, and so far with considerable satisfaction.

In connection with this paper, I wish to thank Dr. E. M. Greene for his valuable services in the examination of sputum, and Dr. F. C. Cobb for laryngeal work, also Mr. Wm. C. Durkee, Ph.G., for most perfect chemical work, and Dr. E. O. Otis for kindly suggestions.

